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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,203	08/17/2005	Stefan Beichl	5038.1004	6597
23280	7590	02/22/2010	EXAMINER	
Davidson, Davidson & Kappel, LLC			LEE, GILBERT Y	
485 7th Avenue				
14th Floor			ART UNIT	PAPER NUMBER
New York, NY 10018			3676	
			MAIL DATE	DELIVERY MODE
			02/22/2010	PAPER

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/540,203

Filing Date: August 17, 2005

Appellant(s): BEICHL, STEFAN

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William C. Chris  
For Appellant

## **EXAMINER'S ANSWER**

This is in response to the appeal brief filed 1/12/10 appealing from the Office action mailed 3/13/09.

### **(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

### **(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

### **(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

### **(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

### **(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

### **(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

## **WITHDRAWN REJECTIONS**

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The rejection of claims 20-23 and 25-35 under 35 U.S.C. 112, second paragraph.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,105,967	Turnquist et al.	12-2002
2002/0140174	Kono	10-2002
2004/0188943	Beichl et al.	9-2004
5,074,748	Hagle	12-1991

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims: Claims 20-23, 25, 27, and 30-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turnquist et al. (US Patent No. 6,105,967) in view of Kono (US Pub. No. 2002/0140174).

Regarding claim 20, the Turnquist et al. reference discloses a sealing arrangement (Fig. 1), comprising:

at least one first sealing device (e.g. 38) including an annular seal (e.g. 44);  
a second sealing device (e.g. 36) including a brush seal (e.g. 36);  
wherein the first and second sealing devices are placed between axially symmetrical components (e.g. 12, 14, or 10) symmetrical about an axis (Fig. 1), and the

second sealing device is positioned so as to be axially offset from the first sealing device (Fig. 1); and

wherein the annular seal is a metallic ring seal (Fig. 1) having a separation site (Col. 4, Lines 54-66).

However, the Turnquist et al. reference fails to explicitly disclose the annular seal being a piston-ring seal.

The Kono reference, a brush seal, discloses that an annular seal can be either split or segmented (Figs. 3,4,6-9,11-14,16-18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to make the annular seal of the Turnquist et al. reference a split ring in view of the teachings of the Kono reference in order to allow enlargement through combination of split-body parts (Kono, Col. 1, Lines 9-13).

Regarding claim 21, the Turnquist et al. reference, as modified in claim 20, discloses the brush seal being. Note that the brush seal of the Turnquist et al. reference is capable of being inserted into a recess of a housing in an axial direction and being secured into position by a fastening ring.

Regarding claim 22, the Turnquist et al. reference, as modified in claim 20, discloses the brush seal being. Note that the brush seal of the Turnquist et al. reference is capable of being inserted or snapped in over a fastening ring into a recess of a housing.

Regarding claim 23, the Turnquist et al. reference, as modified in claim 22, discloses the open brush seal being a split ring (Turnquist et al., Col. 4, Lines 54-66).

Regarding claim 25, the Turnquist et al. reference, as modified in claim 20, discloses the brush seal including a plurality of bristle elements (Turnquist et al., Col. 4, Lines 28-30).

Regarding claim 27, the Turnquist et al. reference, as modified in claim 20, discloses one end (Turnquist et al., e.g. upper end of element 36) of the second sealing device being positioned in a recess (Turnquist et al., e.g. recess of element 12 holding element 14) of a first one of the axially symmetrical components (Turnquist et al., Fig. 1).

Regarding claim 30, the Turnquist et al. reference, as modified in claim 25, discloses the bristle elements being radially preloaded such that they have a curved shape in the radial direction (Turnquist et al., Fig. 1). Note that the bristles of the Turnquist et al. reference will be preloaded because they are designed to bear against element 10.

Regarding claim 31, the Turnquist et al. reference, as modified in claim 20, discloses the axial direction of the axially symmetrical components, the second sealing device is directly contiguous to the first sealing device (Turnquist et al., Fig. 1).

Regarding claim 32, the Turnquist et al. reference, as modified in claim 32, discloses the first sealing device forming a supporting plate for the bristle elements of the second sealing device (Turnquist et al., Fig. 1).

Regarding claim 33, the Turnquist et al. reference, as modified in claim 20, discloses a second one (Turnquist et al., e.g. 12) of the axially symmetrical components surrounding a first one (Turnquist et al., e.g. 10) of the axially symmetrical components.

Regarding claim 34, the Turnquist et al. reference, as modified in claim 33, discloses the second one of the axially symmetrical components being made up of a plurality of segments (Turnquist et al., Col. 3, Line 66 - Col. 4, Line 2).

Regarding claim 35, the Turnquist et al. reference, as modified in claim 20, discloses a first one (Turnquist et al., e.g. 12) of the axially symmetrical components comprising a housing of a gas turbine (Turnquist et al., Col. 3, Lines 57-61), and the second one (Turnquist et al., e.g. 14) of the axially symmetrical component includes a guide vane ring (Turnquist et al., e.g. 14) of a gas turbine having a plurality of vane segments (Turnquist et al., Col. 3, Line 66 - Col. 4, Line 2), the first sealing device and the second sealing device being positioned between the housing and the vane segments (Turnquist et al., Fig. 1, e.g. annularly) in order to seal a gap (Turnquist et al., e.g. gap between element 14 and 10).

Regarding claim 36, the Turnquist et al. reference, as modified in claim 20, discloses the separation site having an overlapping form (Kono, Figs. 3,4,6-9,11-14,16).

Claims 26, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turnquist et al. in view of Kono as applied to claims 20-23, 25, 27, and 30-36 above, and further in view of Beichl et al. (US Pub. No. 2004/0188943 A1).

Regarding claim 26, the modified Turnquist et al. reference discloses the invention substantially as claimed in claim 25.

However, the modified Turnquist et al. reference fails to explicitly disclose the bristle element being wound around a guide element and being secured by a clamping element.

The Beichl et al. reference, a brush seal for a turbomachine, discloses that a brush seal can be welded (Fig. 7) or wound around a guide element (Fig. 5, 20) and secured by a clamping element (17).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a guide element and a clamping element to the modified Turnquist et al. reference in view of the teachings of the Beichl et al. reference in order to provide a frictional variant (Beichl et al., Para. [0021]).

Regarding claim 28, the modified Turnquist et al. reference discloses the invention substantially as claimed in claim 27.

However, the modified Turnquist et al. reference fails to explicitly disclose the bristle element being wound around a guide element.

The Beichl et al. reference, a brush seal for a turbomachine, discloses that a brush seal can be welded (Fig. 7) or wound around a guide element (Fig. 5, 20).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a guide element to the modified Turnquist et al. reference in view of the teachings of the Beichl et al. reference in order to provide a frictional variant (Beichl et al., Para. [0021]).

Regarding claim 29, the Turnquist et al. reference, as modified in claim 28, discloses the unattached ends of the bristle elements engaging the second one (Turnquist et al., e.g. 28) of the axially symmetrical components.

Claims 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turnquist et al. in view of Kono and Hagle (US Patent No. 5,074,748).

Regarding claim 37, the Turnquist et al. reference discloses a sealing arrangement (Fig. 1), comprising:

at least one first sealing device (e.g. 38) including an annular seal (e.g. 44);  
a second sealing device (e.g. 36) including a brush seal (e.g. 36);  
wherein the first sealing device and the second sealing device are placed between axially symmetrical components (e.g. 12, 14, or 10) symmetrical about an axis (Fig. 1), and the second sealing device is positioned so as to be axially offset from the first sealing device (Fig. 1); and

wherein the annular seal is a metallic ring seal (Fig. 1) having a separation site (Col. 4, Lines 54-66).

However, the Turnquist et al. reference fails to explicitly disclose the sealing arrangement used in fixed components and the annular seal being a piston-ring seal.

The Hagle reference, a brush seal, discloses the use of brush seals in static components of a turbine (Col. 2, Lines 7-9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use seal of the Turnquist et al. reference in a static part of turbine in view of

the teachings of the Hagle reference since the compliant nature of brush seal bristles can maintain resilient biased sealing contact at all times (Hagle, Lines 24-28)

The Kono reference, a brush seal, discloses that an annular seal can be either split or segmented (Figs. 3,4,6-9,11-14,16-18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to make the annular seal of the Turnquist et al. reference a split ring in view of the teachings of the Kono reference in order to allow enlargement through combination of split-body parts (Kono, Col. 1, Lines 9-13)

Regarding claim 38, the Turnquist et al. reference, as modified in claim 37, discloses the brush seal. Note that the brush seal of the Turnquist et al. reference is capable of being inserted into a recess of a housing in an axial direction and being secured into position by a fastening ring.

Regarding claim 39, the Turnquist et al. reference, as modified in claim 37, discloses the brush seal. Note that the brush seal of the Turnquist et al. reference is capable of being inserted or snapped in over a fastening ring into a recess of a housing.

Regarding claim 40, the Turnquist et al. reference, as modified in claim 37, discloses the brush seal including a plurality of bristle elements (Turnquist et al., Col. 4, Lines 28-30).

## **(10) Response to Argument**

### A. Rejections under 35 U.S.C. §112, second paragraph

Appellant argues the validity of the rejections of claims 20-23 and 25-35 under 35 U.S.C. §112, second paragraph.

The argument is persuasive and the rejection has been withdrawn.

C. Rejections under 35 U.S.C. §103(a)

Appellant argues that the combination of the Turnquist et al. reference in view of the Kono reference fails to disclose an "annular seal is a metallic piston-ring seal having a separation site".

The current disclosure does not set forth a definition for a "piston-ring seal". A piston-ring seal is generally used to describe a seal that is provided for a part that reciprocates along an axis of an enclosing wall. However, appellant's invention does not necessarily fit that definition. Since the current disclosure is directed to a seal for a turbine, and since a special definition of a piston ring is not provided by the appellant, examiner is interpreting "piston ring" to be merely a ring with at least one separation site. It appears that the only real requirement of a "piston-ring seal" as used in the current disclosure is a seal with a "separation site". The claims are open-ended and clearly the combination of the Turnquist et al. and the Kono reference would provide a seal with multiple separation sites (Kono, splits shown by faces 3D and Col. 4, Lines 51-54).

Appellant further argues that the combination of the Turnquist et al. reference in view of the Kono reference would not be obvious because the Turnquist et al. reference describes that "to prevent relative circumferential movement of the brush segment and

seal ring segment, the brush segment and seal ring segments are welded to one another adjacent one or both opposite end faces".

It is clear from the recited passage that the Turnquist et al. reference wishes to weld the bristles to the ring segments to prevent circumferential movement between the two. Providing a segmented seal would not prevent the bristles from being welded to the ring segments and would still prevent relative circumferential movement between the bristles and the ring segments.

Claims 26, 28, and 29: Argued Separately

Appellant argues that the Beichl et al. reference fails to cure the deficiencies of the Turnquist et al. and Kono references.

As discussed above, the Turnquist et al. reference in view of the Kono reference does teach claims 20-23, 25, 27, and 30-36. It is also to be noted that the Beichl et al. reference was only used as a teaching for a guide element and a clamping element.

Claims 27 to 40: Argued Separately

Appellant argues that the combination of the Turnquist et al. reference in view of the Kono reference fails to disclose an "annular seal is a metallic piston-ring seal having a separation site".

The current disclosure does not set forth a definition for a "piston-ring seal". A piston-ring seal is generally used to describe a seal that is provided for a part that reciprocates along an axis of an enclosing wall. However, appellant's invention does

not necessarily fit that definition. Since the current disclosure is directed to a seal for a turbine, and since a special definition of a piston ring is not provided by the appellant, examiner is interpreting "piston ring" to be merely a ring with at least one separation site. It appears that the only real requirement of a "piston-ring seal" as used in the current disclosure is a seal with a "separation site". The claims are open-ended and clearly the combination of the Turnquist et al. and the Kono reference would provide a seal with multiple separation sites (Kono, splits shown by faces 3D and Col. 4, Lines 51-54).

Appellant further argues that the Hagle reference fails to cure the deficiencies of the Turnquist et al. and Kono references.

As discussed above, the Turnquist et al. reference in view of the Kono reference does teach claims 37-40; but fails to explicitly disclose the sealing arrangement used in fixed components. The Hagle reference teaches the use of brush seal in static components of a turbine and therefore cures the deficiencies of the Turnquist et al. reference in view of the Kono reference.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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/Thomas B Will/

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